

TABLE 4.—Observations by means of kites, captive and limited height sounding balloons during December, 1930

	Broken Arrow, Okla.	Due West, S. C.	Ellendale, N. Dak.	Groesbeck, Tex.	Royal Center, Ind.
Mean altitudes, (meters) m. s. l., reached during month.....	2,839	2,193	2,649	2,184	2,687
Maximum altitude (meters), m. s. l., reached.....	4,212	4,588	4,794	3,397	4,588
Number of flights made.....	30	32	32	23	29
Number of days on which flights were made.....	29	31	29	23	28

In addition to the above there were approximately 176 pilot balloon observations made daily at 60 Weather Bureau stations in the United States.

AEROLOGICAL OBSERVATIONS FOR THE YEAR 1930

By L. T. SAMUELS

Free-air temperatures during 1930 were slightly above normal in the northern part of the country and slightly below in the southern part. (Table 1.) There was a tendency for the negative departures to increase in magnitude with elevation.

Free-air relative humidity departures were mostly negative and of small magnitude. Negative relative humidity departures occurred with negative temperature departures at most stations and levels and this appears significant in connection with the general drought which prevailed.

Vapor pressure departures were negative except at Ellendale and in the upper levels at Broken Arrow, Due West, and Royal Center. The largest negative departures occurred at Groesbeck.

From Table 2 it is found that the total number of flights (kites, captive, and limited-height sounding balloons) made during the year at the five stations was 1,749. This is an average of 350 flights per station. The average altitude reached was 2,743 meters above sea level. The highest elevation (8,384 meters) reached during the year was that of a limited-height sounding balloon at Ellendale on September 29, 1930. In addition there were 40 sounding balloon observations made at 10 Weather Bureau stations during January and 36 at Royal Center during September, the latter being the international month.

TABLE 1. Free-air temperatures, relative humidities, and vapor pressures during year 1930

TEMPERATURE (°C.)										
Altitude meters m. s. l.	Broken Arrow, Okla. (233 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Groesbeck, Tex. (141 meters)		Royal Center, Ind. (225 meters)	
	Mean	De- par- ture from nor- mal	Mean	De- par- ture from nor- mal	Mean	De- par- ture from nor- mal	Mean	De- par- ture from nor- mal	Mean	De- par- ture from nor- mal
Surface.....	14.3	-1.2	15.2	-1.3	6.1	+0.5	16.2	-1.9	10.7	-0.3
500.....	14.0	-0.1	14.1	-0.6	5.9	+0.4	15.4	-0.9	9.3	+0.3
1,000.....	12.6	+0.3	12.0	-0.4	5.0	+0.4	14.1	-0.6	7.1	+0.3
1,500.....	10.6	+0.1	9.5	-0.5	3.5	+0.3	12.2	-0.8	4.7	-0.1
2,000.....	8.2	-0.1	6.8	-0.8	1.4	+0.4	10.0	-0.9	2.6	-0.1
2,500.....	5.5	-0.2	4.2	-0.9	-1.2	+0.4	7.4	-1.1	0.2	-0.2
3,000.....	2.6	-0.3	1.6	-0.9	-3.9	+0.5	4.8	-1.1	-2.3	-0.2
4,000.....	-3.8	-1.0	-3.8	-0.8	-9.9	+0.1	-0.8	-1.2	-8.2	-0.9
5,000.....	-9.6	-1.2	-9.4	-0.8	-15.9	-0.2	-----	-----	-14.0	-0.7

RELATIVE HUMIDITY (%)										
Surface.....	69	+1	69	+1	70	-2	78	+4	70	0
500.....	63	-2	64	-2	70	-1	70	-1	67	-2
1,000.....	57	-4	61	-3	64	0	59	-4	64	-2
1,500.....	53	-4	59	-3	59	0	52	-3	60	-2
2,000.....	50	-3	57	-2	56	-1	48	-1	56	-2
2,500.....	48	-2	55	-1	56	0	45	0	53	-1
3,000.....	47	-2	53	0	55	0	43	+1	51	-1
4,000.....	48	+2	53	+3	55	+2	32	-7	47	-1
5,000.....	40	-3	56	+10	51	+1	-----		42	-5

VAPOR PRESSURE (mb.)										
Surface.....	12.93	-0.83	13.58	-0.42	8.03	-0.04	16.21	-0.57	10.50	-0.28
500.....	11.70	-0.46	11.85	-0.52	7.90	+0.04	13.79	-0.88	9.20	-0.16
1,000.....	9.64	-0.33	9.71	-0.70	6.55	+0.18	10.26	-1.34	7.61	-0.14
1,500.....	7.84	-0.21	7.90	-0.71	5.42	-0.16	7.94	-1.04	6.20	-0.07
2,000.....	6.21	-0.13	6.33	-0.55	4.39	-0.08	6.23	-0.70	4.82	-0.20
2,500.....	4.88	-0.08	5.01	-0.42	3.56	-0.03	5.02	-0.46	3.74	-0.12
3,000.....	4.00	+0.07	4.04	-0.27	2.90	-0.06	4.24	-0.14	3.04	+0.01
4,000.....	2.81	+0.36	2.83	+0.02	1.75	-0.08	1.57	-1.31	1.91	+0.07
5,000.....	1.91	+0.38	2.05	+0.71	0.96	-0.22	-----	-----	1.05	-0.26

TABLE 2.—Observations by means of kites, captive and limited height sounding balloons during 1930

	Broken Arrow, Okla.	Due West, S. C.	Ellendale, N. Dak.	Groesbeck, Tex.	Royal Center, Ind.
Mean altitudes (meters), m. s. l., reached during month.....	2,793	2,644	3,004	2,327	2,940
Maximum altitude (meters), m. s. l., reached and date.....	6,397	5,789	8,384	4,485	8,201
Number of flights made.....	354	359	387	302	347
Number of days on which flights were made.....	355	337	348	278	334

¹ Limited height sounding balloon observation.

² Captive balloon observation (breakaway).

In addition to the above there were approximately 150 pilot balloon observations made daily at nearly 60 weather bureau stations in the United States.

WEATHER IN THE UNITED STATES

THE WEATHER ELEMENTS

By M. C. BENNETT

GENERAL SUMMARY

December was mostly mild east of the Rocky Mountains and generally dry. In the west Gulf section and the Southeastern States, as far north as the Potomac and Ohio Rivers, the temperature for the month was below normal, with freezing temperatures extending into Florida, while in the central and northern regions, from the Mississippi Valley to the Rocky Mountains, abnormally high temperatures for the season prevailed; but in the Great Basin it was unusually cold. However, in the far Southwest and Pacific coast districts, near normal temperatures were the rule.

Generous amounts of precipitation were received in many places in the South Atlantic States and in eastern West Virginia, but many of the Atlantic coast districts had less than normal. From the Ohio and Missouri Valleys northward, the totals were small, with large areas receiving less than one-fourth of the normal, while in much of Texas and Oklahoma more than the normal was

received. But from the Rocky Mountains westward the month was generally dry, with considerable areas in the southern portion of the Plateau and Pacific regions receiving no appreciable precipitation.

TEMPERATURE

While a cold snap swept quickly over the north-central and northeastern areas as the month started, yet the first half of December averaged warmer than normal over nearly the whole country, except that portions of the Atlantic States and the lower Lake region averaged slightly colder than normal, while decidedly cold weather persisted in the northern and central Plateau areas.

From the middle of the month onward warm weather persisted in the north-central portion from Wisconsin and northern Illinois to central Montana and northeastern Wyoming, and this period was slightly warmer than normal in New England and much of New York, Washington, and California. The greater part of the country, however, was cooler than normal during most of this half-month. The southeastern portion and the Plateau region showed fairly large negative departures, low temperatures prevailing in the former from the 17th to the 24th, while